

## REMARKS

In response to the Office Action dated February 4, 2011, Applicants respectfully request reconsideration based on the above claim amendments and the following remarks. Applicants respectfully submit that the claims as presented are in condition for allowance.

Claims 1-5, 7-14 and 16-19 are pending in the present Application. Claims 3-5, 7-14 and 16 are withdrawn as being directed to non-elected subject matter in the June 27, 2007 response to Restriction Requirement of June 12, 2007. Claims 6 and 15 were cancelled response to the non-final office action of August 21, 2009. Claim 1 is amended, leaving Claims 1, 2 and 17-19 for consideration upon entry of the present amendment and following remarks.

In the claimed invention, the PCR channel extends in a first direction and the first and second micro-valves extend in a second direction. The first and second directions are on the same plane and the second direction is perpendicular to the first direction. Support for this amendment can be found at least in the Figures 1 and 2.

No new matter has been introduced by these amendments. Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

### **Claim Rejections Under 35 U.S.C. §102(b)**

Claims 1, 2, and 17-19 are rejected under 35 U.S.C. §102(b) as being allegedly anticipated by Zhao et al., U.S. Patent Application Publication No. 2002/0079219 (hereinafter "Zhao"). (See Office Action dated 02-04-2011, page 3)

To anticipate a claim under 35 U.S.C. § 102, a single source must contain all of the elements of the claim. *Lewmar Marine Inc. v. Bariant, Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 1007 (1988).

Claim 1 as presently amended is directed to a PCR (polymerase chain reaction) device comprising an inlet through which a biochemical fluid is injected; an outlet through which the biochemical fluid is discharged; a PCR channel positioned between the inlet and the outlet; a heat source for operating the PCR device; and first and second micro-valves which is formed as channel for containing a sol-gel transformable material, wherein the first and second micro-

valves control opening and closing of the inlet and the outlet, and intersect portions of the PCR channel near the inlet and the outlet of the PCR device, respectively; wherein the PCR channel extends in a first direction on a plane and the first and second micro-valves extend in a second direction on the plane of the PCR channel, the first direction and the second direction being perpendicular to each other, wherein the sol-gel transformable material transforms from a sol state into a gel state at a temperature lower than DNA denaturation temperature, annealing temperature and extension temperature and higher than room temperature, as the temperature increases to operate the PCR by the heat source; and is operative to control the opening and closing of the first and second micro-valves; wherein an additional heat source for controlling the temperature of the sol-gel transformable material is absent from the PCR device; and wherein an additional valve means for the inlet and the outlet other than the first and second micro-valves is absent.

The invention of Claim 1 has first and second micro-valves which are formed as channel intersecting the PCR channel. The PCR channel extends in a first direction and the first and second micro-valves extend in a second direction. The first and second directions are on the same plane and the second direction is perpendicular to the first direction.

Zhao discloses a microfluidic device for conducting chemical operations. The Examiner has stated that portions of the microchannel 14 near the reservoirs 26 of Zhao correspond to the first and second micro-valves of the claimed invention. (See Office Action dated 02-04-2011, page 3). However, as described in Zhao, the microchannel 14 and the reservoirs 26 are not formed on the same plane.

In particular, Zhao discloses that the reservoirs 26 are formed at through-holes 24 of a planar substrate 18 having the microchannel 14 formed thereon (see paragraph [0053] and FIGS. 1 and 2). While the channel 14 extends in a direction parallel to the surface of the substrate 18 (e.g., horizontally), the reservoirs 26 extend in another direction which is perpendicular to the surface of the substrate 18 (e.g., vertically). Thus, the extending directions of the channel 14 and the reservoirs 26 are not on the same plane.

Further, Zhao does not disclose another channel which is formed on the plane of the microchannel 14 and extends perpendicularly to the microchannel 14.

For this reason at least, the invention of Claim 1 is different from the invention of Zhao. The Applicants believe that Zhao therefore cannot anticipate the claimed invention. The Applicants respectfully request a withdrawal of the anticipation rejection and an allowance of the claims.

**Claim Rejections Under 35 U.S.C. §102(a)**

Claims 1, 2, and 17-19 are rejected under 35 U.S.C. §102(a) as being allegedly anticipated by Koh et al., *Analytical Chemistry*, 2003, Vol. 75, pp. 4591-4598, “*Integrating Polymerase Chain Reaction, Valving, and Electrophoresis in a Plastic Device for Bacterial Detection*” (hereinafter “Koh”). (See Office Action dated 02-04-2011, page 4)

Koh was published on *Analytical Chemistry*, Vol. 75, No. 17 on September 1, 2003, and was published on web on July 26, 2003. The instant application claims priority to KR Application No. 10-2003-0010729 filed February 20, 2003.

An English translation of KR Application No. 10-2003-0010729 is submitted herewith to perfect the priority claim to KR Application No. 10-2003-0010729. Since Koh was published after the earliest foreign priority date, February 20, 2003, Koh does not qualify as prior art under 35 U.S.C. § 102(a).

Applicants request reconsideration and withdrawal of the rejection of Claims 1, 2, and 17-19 as being anticipated by Koh.

**Conclusion**

In view of the foregoing, it is respectfully submitted that the instant application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance issued. If the Examiner believes that a telephone conference with Applicants' attorneys would be advantageous to the disposition of this case, the Examiner is cordially requested to telephone the undersigned.

In the event the Commissioner of Patents and Trademarks deems additional fees to be due in connection with this application, Applicants' attorney hereby authorizes that such fee be charged to Deposit Account No. 06-1130.

Respectfully submitted,

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